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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/977,158	10/11/2001	Richard Lai	12-1166	3901

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EXAMINER

MACARTHUR, SYLVIA

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 09/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/977,158	LAI ET AL.	
	Examiner	Art Unit	
	Sylvia R MacArthur	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on _____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 4,5,9, 11, 14, and 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Lee et al (US 6,235,147).

Regarding claims 1 and 11: Lee teaches a wet-etching facility for manufacturing semiconductor devices. Fig. 3 depicts a fixture 30 having a plurality of horizontally oriented receptacles 31a and an etchant solution 3 capable of isotropically removing a layer of semiconductor material from the backside surface of the plurality of wafers. Note col. 9 lines 17-26 discusses that when the loaded fixture is immersed into the etchant solution for a sufficient period of time semiconductor material is removed from the backside surface of the plurality of wafers 1.

Regarding claims 4 and 14: Col. 5 lines 4-9 discusses that a wafer guide rotation apparatus is provided to rotate the wafers via motor 35.

Regarding claims 5 and 15: Col. 7 lines 20-29 of Tran discusses that a circulation line 70 is provided.

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Regarding claim 9: The semiconductor devices manufactured by the apparatus of Lee are inherently capable of being incorporated into the devices discussed.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2, 3, 7, 8, 10, 12, 13, 17, 18, 19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee in view of Tran et al (US 6,187, 515).

The teachings of Lee were discussed above.

Regarding claims 2, 3, 12, and 13: Lee fails to teach the composition of the etchant solution mixture.

Tran teaches an etchant solution comprised of a mixture of acetic acid, hydrogen bromide, potassium dichromate, and water in col. 6 lines 40-56. Tran further teaches that the solution has a volume ratio of 4.5 parts water: 3 parts, hydrobromic acid: 1 part acetic acid, and 66 g of potassium dichromate: 100 ml: 300 ml solution.

The motivation to provide an etchant solution comprising the mixture state above is that it is a suitable etchant solution known by those of ordinary skill in the art to etch wafers made of III-V semiconductor materials, see col. 9 lines 13-18.

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Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to utilize an etchant solution in the apparatus of Lee with the composition suggested by Tran.

Regarding claims 7 and 17: Lee fails to teach the temperature of the etchant solution.

Tran teaches the etchant solution is maintained at a temperature between 40 to 60 deg. Celsius, see col. 6 lines 54-56.

Temperature is an art recognized optimizable operating parameter.

One of ordinary skill in the art at the time of the claimed invention would have found it obvious at the time of the claimed invention to maintain the temperature within a range that would optimize the chemical and physical properties of the chemical solution to yield the desired etching process result.

Regarding claims 8 and 18: Lee fails to teach the composition of the semiconductor material.

Col. 5 line 56 of Tran teaches that the wafer comprises InP.

Indium phosphide is an art recognized semiconductor material well known in the art to provide advantageous results in manufacturing many types of reflective mirrors, fiber optical devices, and optical integrated circuits as suggested by Tran in col. 5 lines 8-17.

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to utilize InP as a material of construction for semiconductor substrates.

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Regarding claims 10 and 20: Lee fails to teach the final thickness of the semiconductor wafer.

Tran teaches the final thickness of the substrate is between 135 and 175 microns as illustrated in Fig. 5a. Tran notes the process steps are performed to provide the substrate with a desired thickness. The thickness of finished substrate is a well known optimizable parameter.

One of ordinary skill in the art at the time of the claimed invention would have found it obvious

Regarding claim 19: Lee fails to teach the use of the manufactured wafer.

Tran notes in col. 5 lines 8-17 and 30-35 that the thinned wafers can be incorporated into waveguides and optical integrated circuits, which includes microwave and millimeter wave circuits.

Furthermore the thinned wafers formed from the combined teachings of Tran and Lee are known as suitable precursor materials in various products dependent upon the desired result.

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to incorporate thinned wafers into such products as microwave and millimeter wave circuits.

5. Claims 6 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee in view of Mendes (US 4,350,553).

The teachings of Lee were discussed above.

Lee fails to discuss a temperature adjusting apparatus.

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Mendes teaches etching semiconductor wafers in an acid bath. A temperature regulator 98 for the acid bath apparatus.

Mendes teaches that acid bath are highly volatile and temperature control is paramount to ensure safety, see col. 5 lines 1-13.

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide a temperature adjustment apparatus in the apparatus of Lee to increase the safety in the highly volatile chemical environment.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sylvia R MacArthur whose telephone number is 703-306-5690. The examiner can normally be reached on M-F during the core hours of 8 a.m. and 2 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory L. Mills can be reached on 703-308-1633. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Sylvia R MacArthur
Patent Examiner
Art Unit 1763


September 3, 2003